

# Seasonal adjustment and changing seasonality in Labour Force statistics

An overview of the approach that the ABS takes to seasonal adjustment and accounting for changing seasonality in Labour Force statistics

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This article provides an overview of the approach that the ABS takes to seasonal adjustment and accounting for changing seasonality in Labour Force statistics. Its release coincides with the latest annual series review, undertaken between the March and April releases.

Seasonal adjustment is a statistical technique that seeks to measure and remove the effects of systematic calendar-related patterns (that is, things that happen at the same time every year, like lower employment and hours in January).

The COVID-19 pandemic was a period of major disruption, with large month-to-month changes in the seasonally adjusted Labour Force series. Now, four years on from the start of the pandemic, we still periodically see larger-than-usual increases or decreases in seasonally adjusted data.

This challenge is not unique to Australia, with countries around the world also faced with similar changes that, like the ABS, they are actively assessing, managing, and explaining.

In exploring seasonal adjustment and seasonality, this article highlights recent larger-than-usual monthly changes in seasonally adjusted Labour Force series, focusing on total hours worked and employment. It concludes with information on some recent changes in dynamics and behaviours that have contributed to these larger movements in the seasonally adjusted series.

## Seasonal adjustment and accounting for changing seasonality in Labour Force statistics

Times series provide insights into changes in statistics of interest over time (such as employment, unemployment and hours worked in the labour market). The 'original' Labour Force series (that is, the unadjusted time series)

reflects the sequence of data from each monthly Labour Force Survey and reflects three components - the underlying trend, seasonal elements, and irregular/short-term elements.

Seasonal adjustment is a statistical technique that seeks to measure and remove the effects of systematic calendar-related patterns. Seasonally adjusting a time series is useful if you wish to understand the underlying patterns of change or movement in a series, without the impact of the seasonal elements (for example, reduced employment and hours worked during January). In contrast to the trend series, seasonal adjustment does not aim to remove the short-term or irregular influences in the original data. For a simple explanation of this, see the [ABS guide to time series \(/statistics/understanding-statistics/statistical-terms-and-concepts/time-series-data\)](#).

To seasonally adjust a series, the ABS uses a method called concurrent adjustment to derive 'seasonal factors', which are an estimate of the calendar and seasonal effects. This method uses data up to the current month (or quarter for quarterly data) to estimate the seasonal factors for the current month and re-estimate (and revise) them for previous months. Further information on this can be found in the [Labour Force methodology summary \(/methodologies/labour-force-australia-methodology/apr-2024#seasonal-adjustment-and-trend-estimation\)](#), the [Time Series Analysis Frequently Asked Questions \(https://www.abs.gov.au/ausstats/abs@.nsf/mf/1346.0.55.002\)](#) and [A Guide to Interpreting Time Series – Monitoring Trends \(https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1349.02003?OpenDocument\)](#).

In addition to the monthly estimation, seasonal factors are also reviewed annually, at a more detailed level. The annual series review uses the context gained from an additional year of original data to assess the appropriateness of seasonal adjustment parameters and prior corrections. This process is typically done around March or April for Labour Force statistics and generally only results in minor revisions, as can be seen in the [April 2024 Labour Force release \(/statistics/labour/employment-and-unemployment/labour-force-australia/apr-2024#survey-impacts-and-changes\)](#).

By their very nature, seasonal patterns are only visible when looking across multiple years. Given this, there are limitations in how quickly a change in a pattern will be reflected in changes to the seasonal factors.

When there is a discernible change in a seasonal pattern, it will generally be reflected in corresponding changes in the seasonal factors after three years, and the seasonal factors for a month will be reasonably stable after six years (after which revisions tend to be minimal). This is an important part of the methodology, as some changes may be part of a continuing change, while others may be more related to specific economic or social conditions (that is, stronger or weaker changes that then start to revert to a more long-term seasonal pattern).

The seasonal adjustment approach applied by the ABS is data driven. This is important since attempting to intervene through applying adjustments to seasonal factors would risk introducing bias or other errors into the Labour Force series, given it would rely on the ABS making assumptions around the extent to which the seasonal patterns are changing. This would be particularly challenging for something as dynamic and complex as the labour market, where the relatively small changes in aggregates usually reflect the net difference in very large underlying gross flows and changes, which are influenced by a broad range of contributing factors.

Instead, when seasonal patterns in Labour Force statistics may look a little unusual, the ABS generally focuses on providing additional guidance and advice to users to help interpret the data. This involves sharing key insights from detailed analysis of historical seasonal patterns in underlying flows and changes in the composition of the Labour Force Survey sample.

This commentary is routinely included in media releases and supporting articles, which provide a useful and transparent guide to how to make sense of unusual data movements. The ABS will also generally couple this advice with supporting analysis of trend series and how changes align with similar changes observed in other non-Labour Force Survey data (for example, changes in statistics based on Single Touch Payroll data or the Job Vacancies Survey).

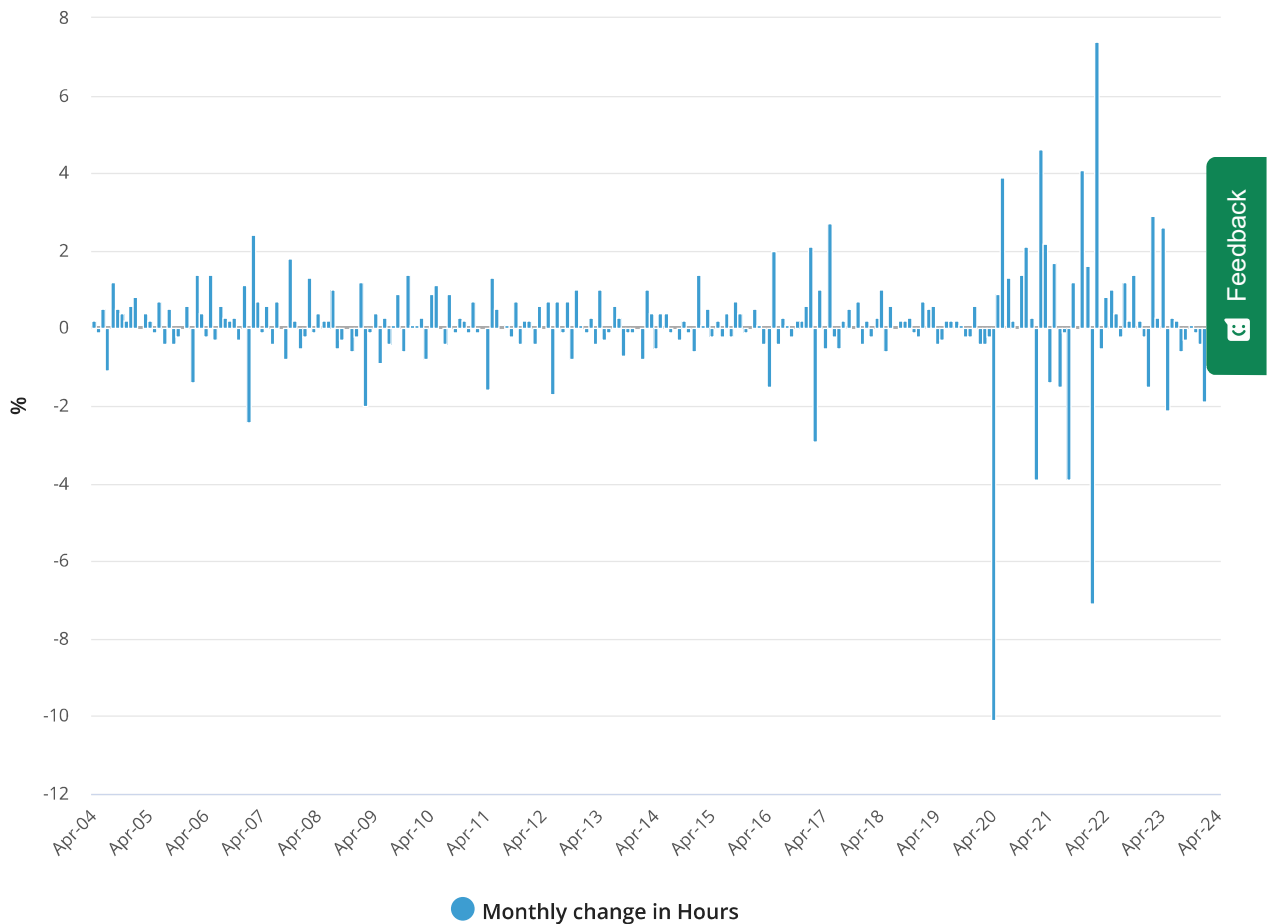


Some recent examples of articles that include analysis and guidance can be found in the [January 2024 Labour Force release \(/articles/insights-job-attachment-january-2024\)](#) and the [November 2023 Retail trade release \(/articles/changes-seasonality-retail-turnover\)](#)).

## Recent behaviour in the seasonally adjusted hours worked and employment series

Chart 1 shows the monthly change in seasonally adjusted total hours worked. Following the large changes during the pandemic-related disruption (from April 2020 to March 2022), some larger changes have continued to be seen in recent periods, particularly around the peak holiday periods of January, April, July and October.

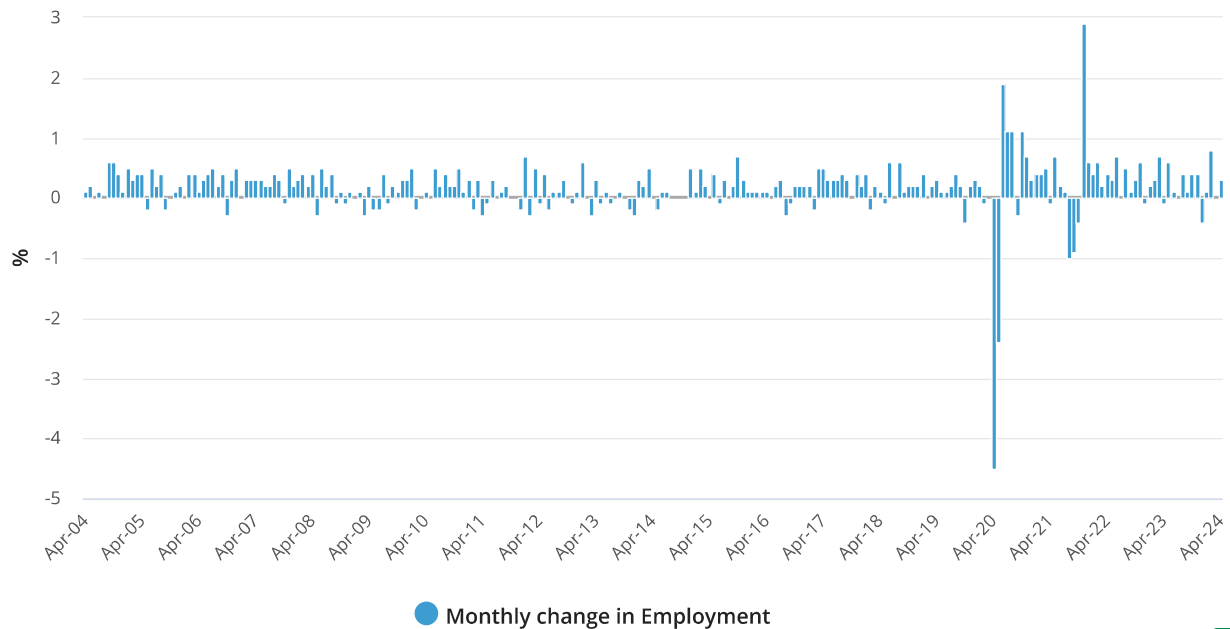
Chart 1: Monthly change in seasonally adjusted total hours worked



Source: Labour Force, Australia, Table 19

While less pronounced than changes in total hours worked, Chart 2 shows that there have also been some relatively large recent movements in seasonally adjusted employment, including a larger fall in December 2023 and a larger rise in February 2024.

Chart 2: Monthly change in seasonally adjusted employment



Source: Labour Force, Australia, Table 1

The recent larger-than-usual increases and decreases in seasonally adjusted hours worked and employment at the times are not necessarily an indication of ongoing structural changes in seasonal patterns in the labour market. Some changes may only be temporary changes in the dynamics and behaviours of people and businesses, within a tight labour market characterised by relatively low unemployment, high participation and high levels of job vacancies. For example, more hours might be worked by existing employees who reduce or postpone their leave to cover a vacancy that cannot be filled, or job starters may have more flexibility and choose to start in February after the summer school holidays, rather than in January.

Future data will be required to fully understand the extent to which recent changes in the labour market may reflect enduring changes in seasonal patterns or irregular/short-term elements.

## The power of trend data during periods of potentially changing seasonality

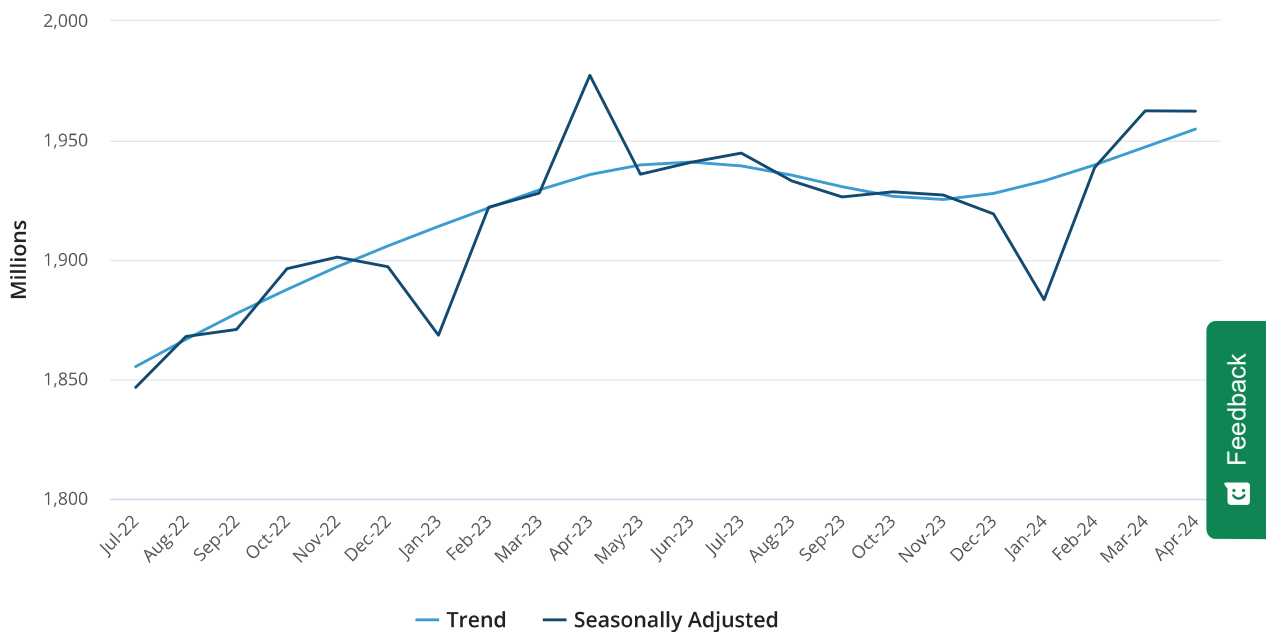
Trend data provides the most reliable measure of the labour market, as it specifically excludes seasonal elements (for example, lower employment and hours in January) and irregular/short-term elements (such as a one-off event, like a flood or a major sporting event). Trend also smooths out month-to-month changes related to sampling variability (that is, changes in who is in the Labour Force Survey sample, month to month), which also contributes to the irregular elements.

Trend data therefore provides the best means of determining whether the labour market is strengthening or softening, and how the composition of the labour market is changing over time. While it is slower to move, as it draws heavily upon data across multiple adjacent months, it provides a more reliable indication of a sustained change.

Trend data is particularly useful in periods where seasonality may be changing more than usual and contributing to larger-than-usual movements in the seasonally adjusted data. During this time, the relative slowness of trend is likely to be less of an issue than the time it takes to get close to the final estimate of a seasonal factor.

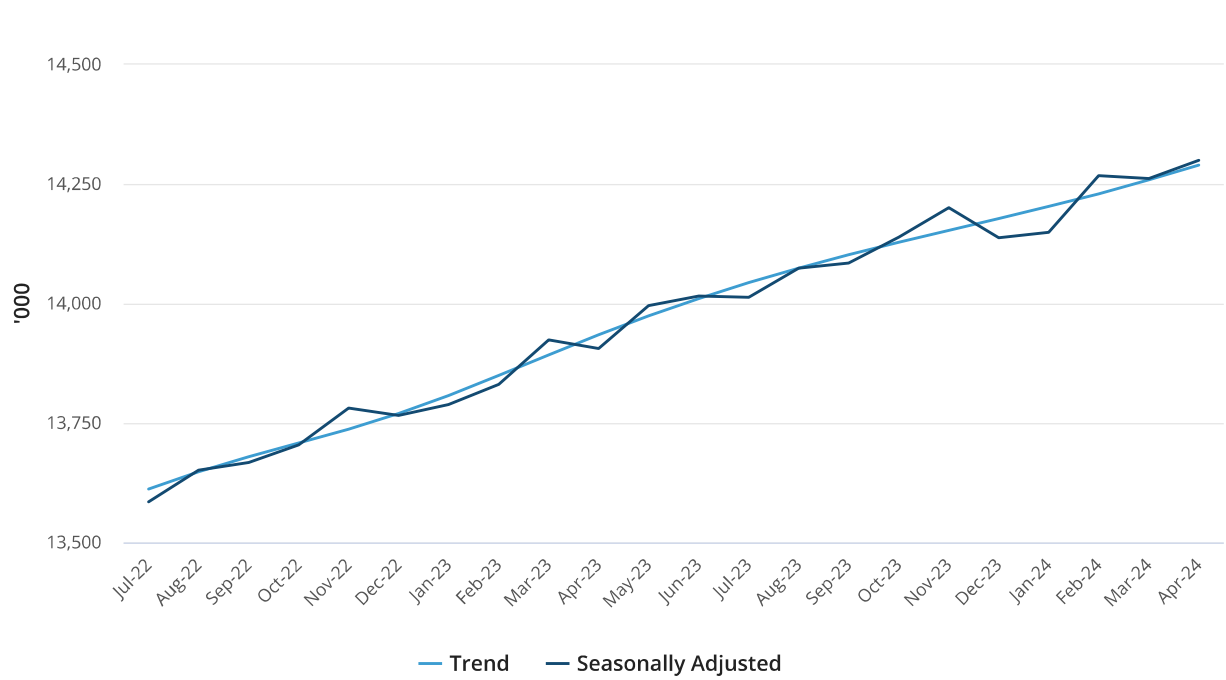
Since the middle of 2022, trend data has been particularly valuable in informing analysis of changes in total hours worked in January, April, July and October, and changes in employment (and related changes in unemployment and the unemployment rate) between November and February. This can be seen in charts 3, 4 and 5.

Chart 3: Monthly hours worked



Source: Labour Force, Australia, Table 19

Chart 4: Employed people



Source: Labour Force, Australia, Table 1

Chart 5: Unemployed people



Feedback

The following two sections provide some examples of factors that have contributed to larger-than-usual month-to-month changes in seasonally adjusted hours worked and employment series.

## Understanding seasonality in hours worked and employment

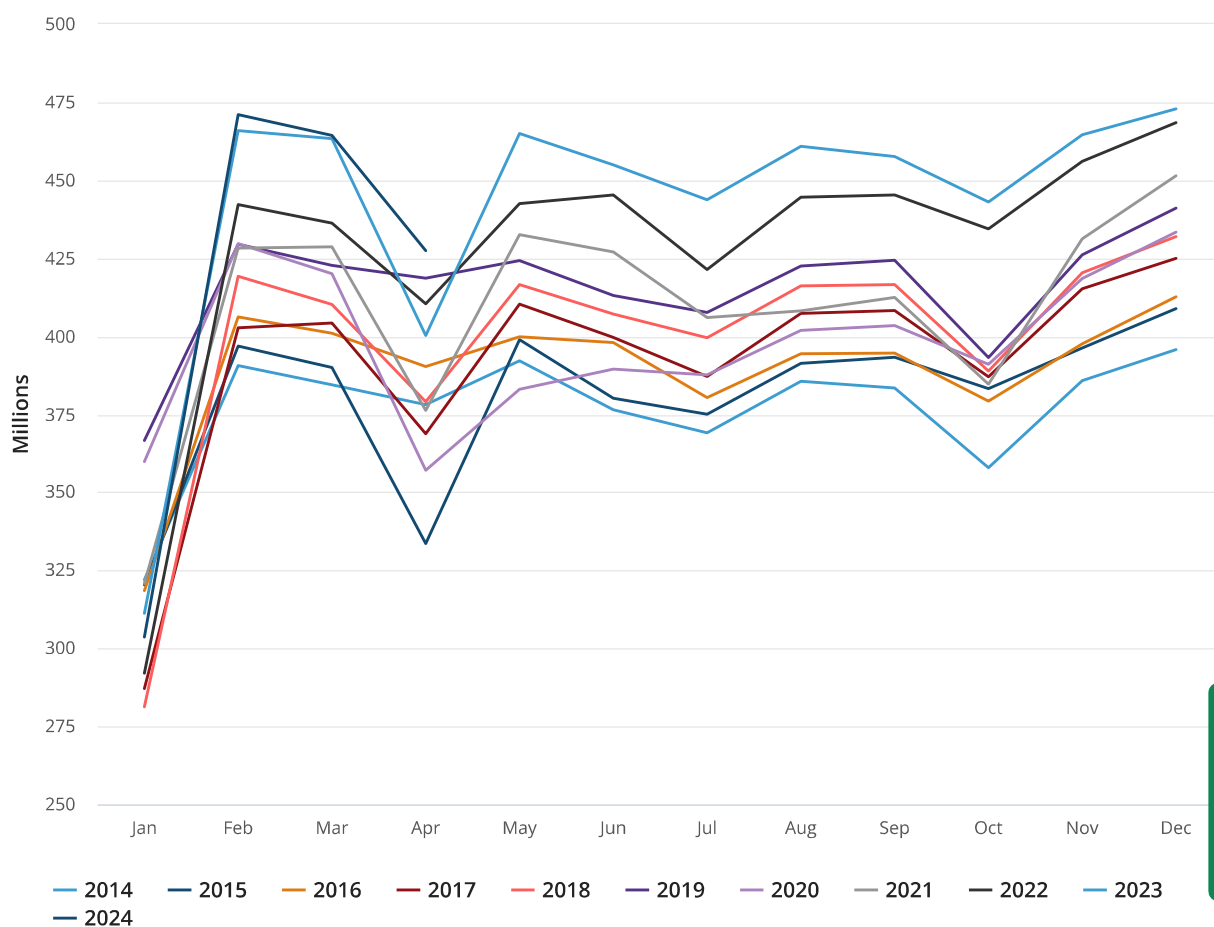
### Understanding seasonality in hours worked: looking at when people take leave

Hours worked are usually more seasonal than employment. Hours are impacted by people taking leave at key points in the year, particularly around the Christmas and New Year period in January data, and around Easter, which is usually reflected in April data. The hours that people work are also heavily influenced by the timing of school holidays (typically January, April, July and October) and public holidays. Moving holidays increase the complexity of seasonal adjustment but are accounted for in ABS methods and processes.

Chart 6 shows that, apart from the major COVID-19 pandemic disruption between April 2020 and March 2022, the total amount of hours worked each week has followed a broadly consistent pattern over the past decade. Hours are lowest in January, reflecting reduced economic activity at the start of the year, when many people take leave. Falls are also seen in April, July and October, around the school holidays, and are greatest over the Easter period in late March or early April.

Chart 6: Number of hours actually worked in all jobs in the reference week, Original





Source: Labour Force, Australia, Detailed, Table 9

However, while the broad pattern is similar year to year, there are a range of underlying dynamics and behaviours in the labour market that have the potential to change this seasonal pattern.

Changes in the timing and amount of leave that people take can change this pattern. Chart 7 shows the proportion of employed people who worked fewer hours than usual in the reference week due to taking annual leave, holidays, flextime, or long service leave. Chart 8 focuses on a subset of this group and shows the proportion of people who worked zero hours for those same reasons.

Some of the changes over time reflect differences in the timing of the survey (for example, how early in January it began, or how much of the Easter long weekend and Easter school holidays were covered). The ABS also explicitly controls for this in its seasonal adjustment processes.

Beyond this timing effect, other changes are more difficult to control for. For example, travel restrictions during the pandemic, coupled with an increase in people working from home, contributed to fewer people than usual taking leave in 2020 and 2021. As restrictions eased, there was an increased use of accumulated leave, particularly during Januarys.

Since the pandemic, seasonally adjusted hours have recently been heavily influenced by periods where more people

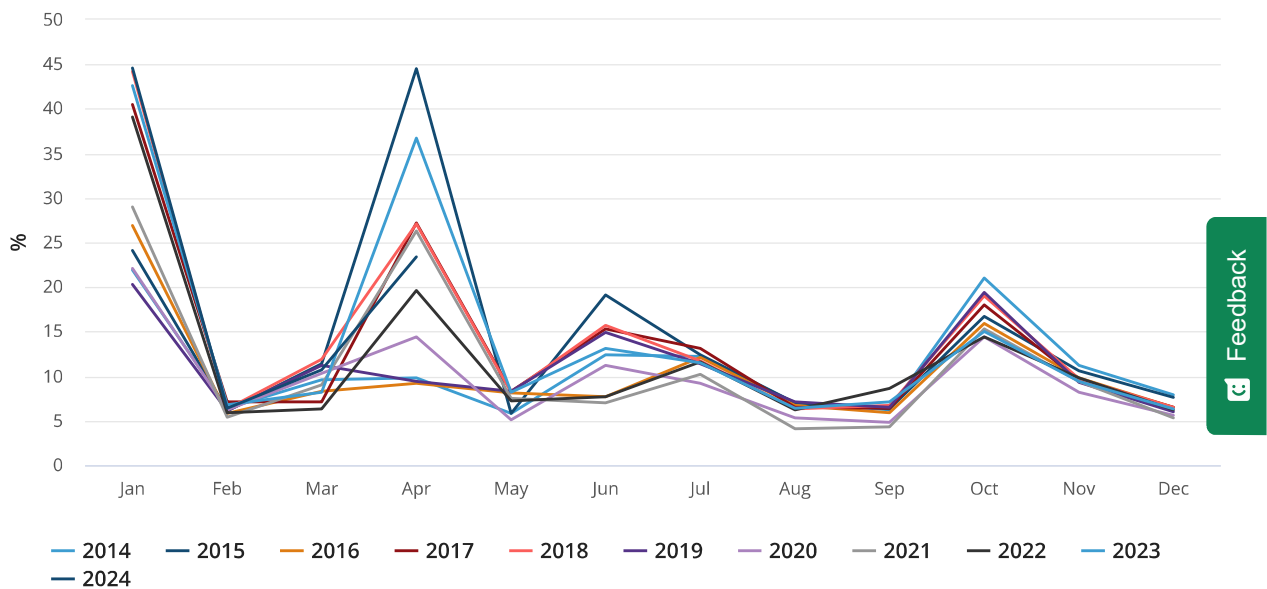


than usual or less people than usual have taken leave, and the amount of leave they took.

In April 2023, a much lower-than-usual number of people took leave around the Easter holidays, which contributed to a substantial increase in the seasonally adjusted hours worked.

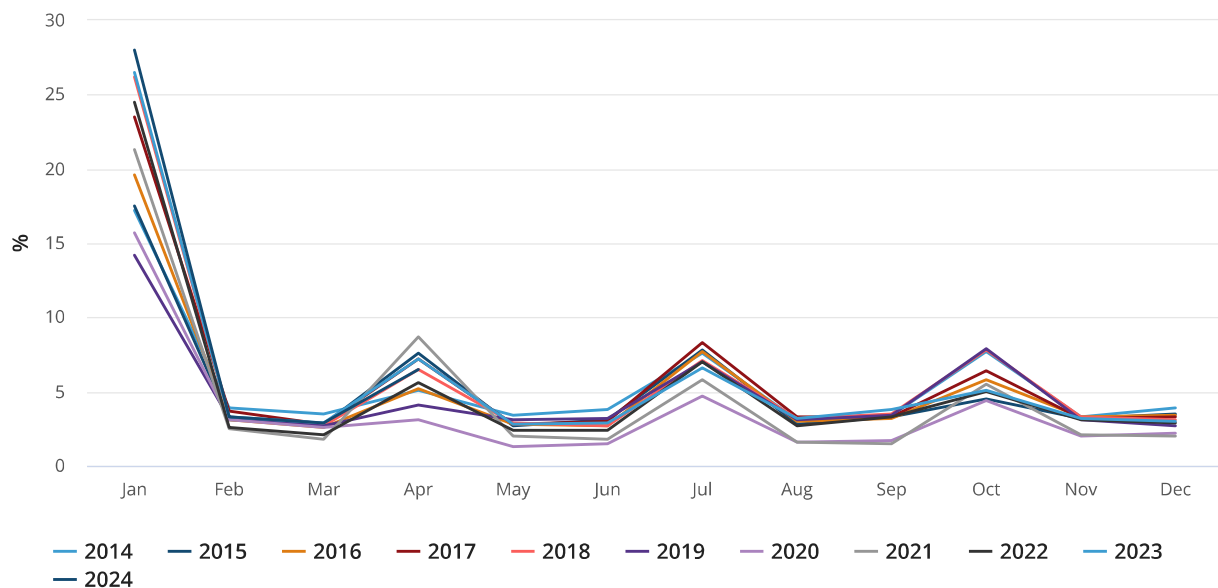
In contrast, in April 2024 this was only slightly lower, when compared with April 2018, which had a similar timing of Easter and Labour Force Survey reference period. Seasonally adjusted hours were similar to March 2024, without any large movement in the seasonally adjusted series.

**Chart 7: Proportion of employed people who worked fewer hours due to annual leave, holidays, flextime or long service leave, Original**



Source: Labour Force, Australia, Detailed, Table 1 and Datacube EM2a

**Chart 8: Proportion of employed people who worked zero hours due to annual leave, holidays, flextime or long service leave, Original**

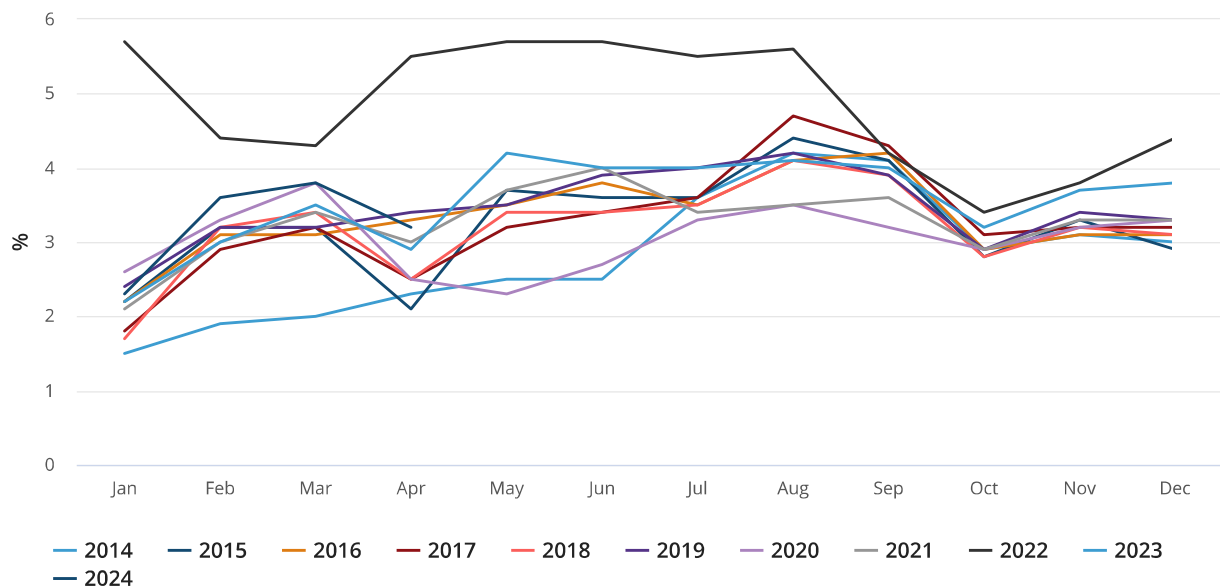


Source: Labour Force, Australia, Detailed, Table 1 and Datacube EM2a

Another reason people may work fewer hours than usual is because they were sick or injured. Chart 9 and Chart 10 show that there are always some people working reduced hours, and that this often peaks around the winter months.

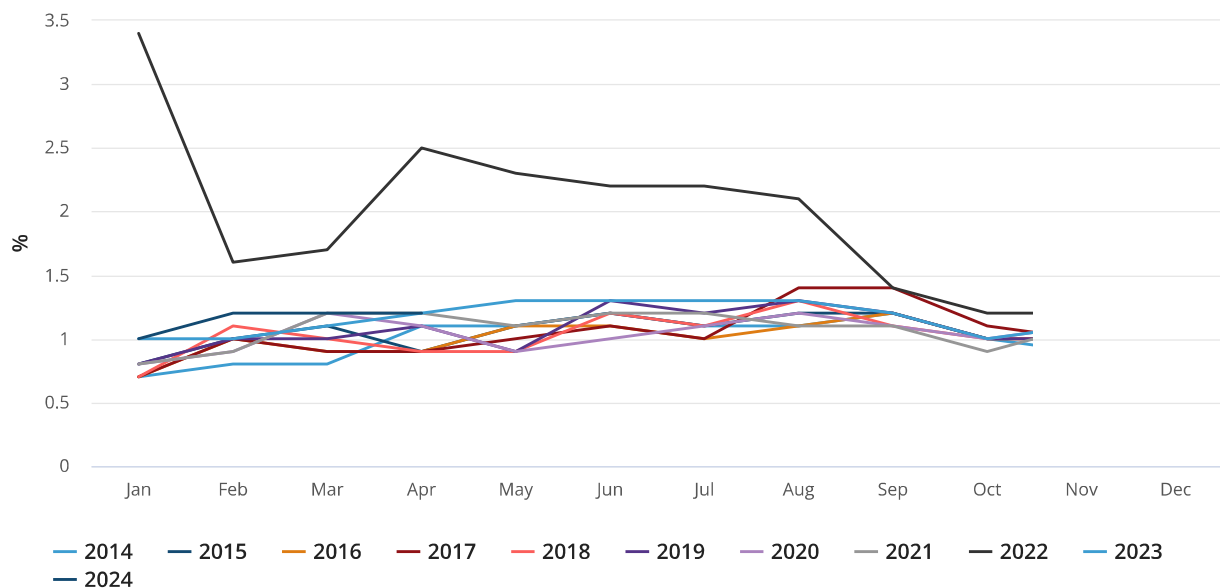
The proportion was particularly elevated in 2022, which coincided with the Omicron variant of COVID-19 and higher-than-usual rates of influenza in the community. It was also higher-than-usual during 2023, and during the first four months of 2024.

**Chart 9: Proportion of people who worked fewer hours due to own illness, injury or sick leave, Original**



Source: Labour Force, Australia, Detailed, Table 1 and Datacube EM2a

Chart 10: Proportion of people who worked zero hours due to own illness, injury or sick leave  
Original



Feedback

Compared to annual leave, holidays, flextime and long service leave, these patterns are much less stable and systematic, and this variation may mean they are more likely to be reflected in the irregular component of the time series, more than the seasonal pattern.

Beyond the examples of leave and sickness, there are many other economic and social factors, and worker-related and business-related factors, that can potentially influence the total hours that are worked in the labour market in any given month.

In practice, the ABS seasonal adjustment process looks at the evolving patterns in the high-level aggregates, which analyses the combined effect of all of these underlying factors to produce the best estimate of the current seasonal factors. The detailed underlying original data is used to understand and explain large changes in seasonally adjusted hours worked, through identifying contributing irregular elements.

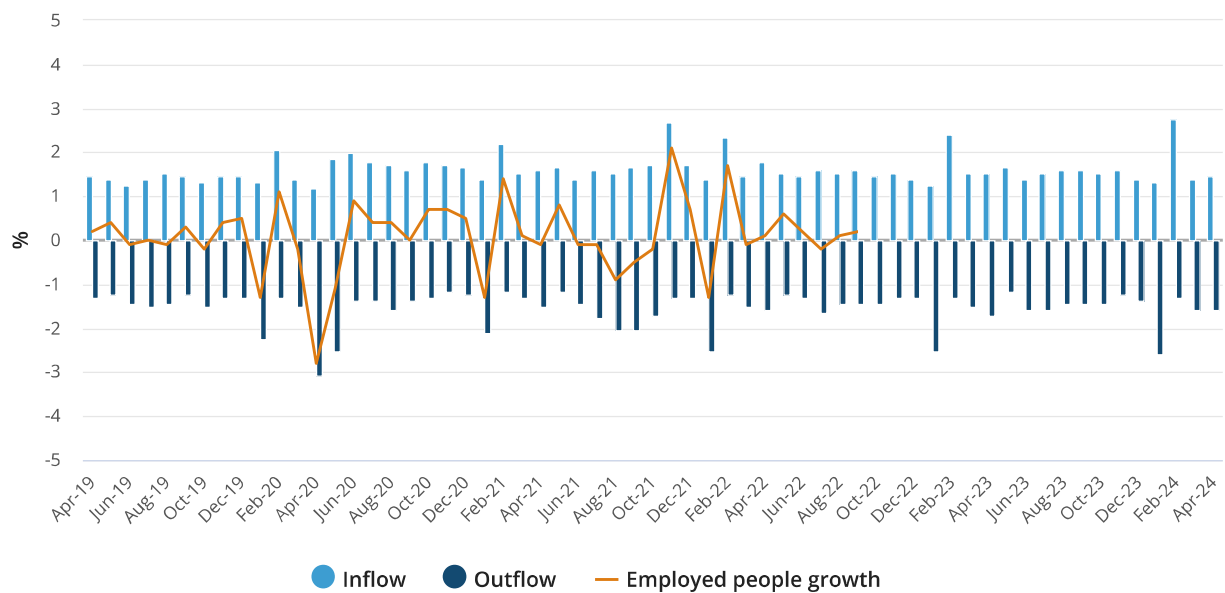
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## Understanding seasonality in employment: looking at when people start of return to jobs

Changes in employment and unemployment statistics reflect the net outcomes from large numbers of people entering and exiting employment every month (referred to in Labour Force products as 'gross flows'). These flows also have seasonal patterns.

As Chart 11 shows, summer months are when these flows are most pronounced – with the greatest number of people leaving employment between December and January, and the greatest number entering employment between January and February. The only recent exception to this was during the major disruption of the pandemic when larger gross flows were also seen in other months of the year.

**Chart 11: Monthly inflows, outflows and employment growth as a proportion of the population aged 15 years and over, Original**

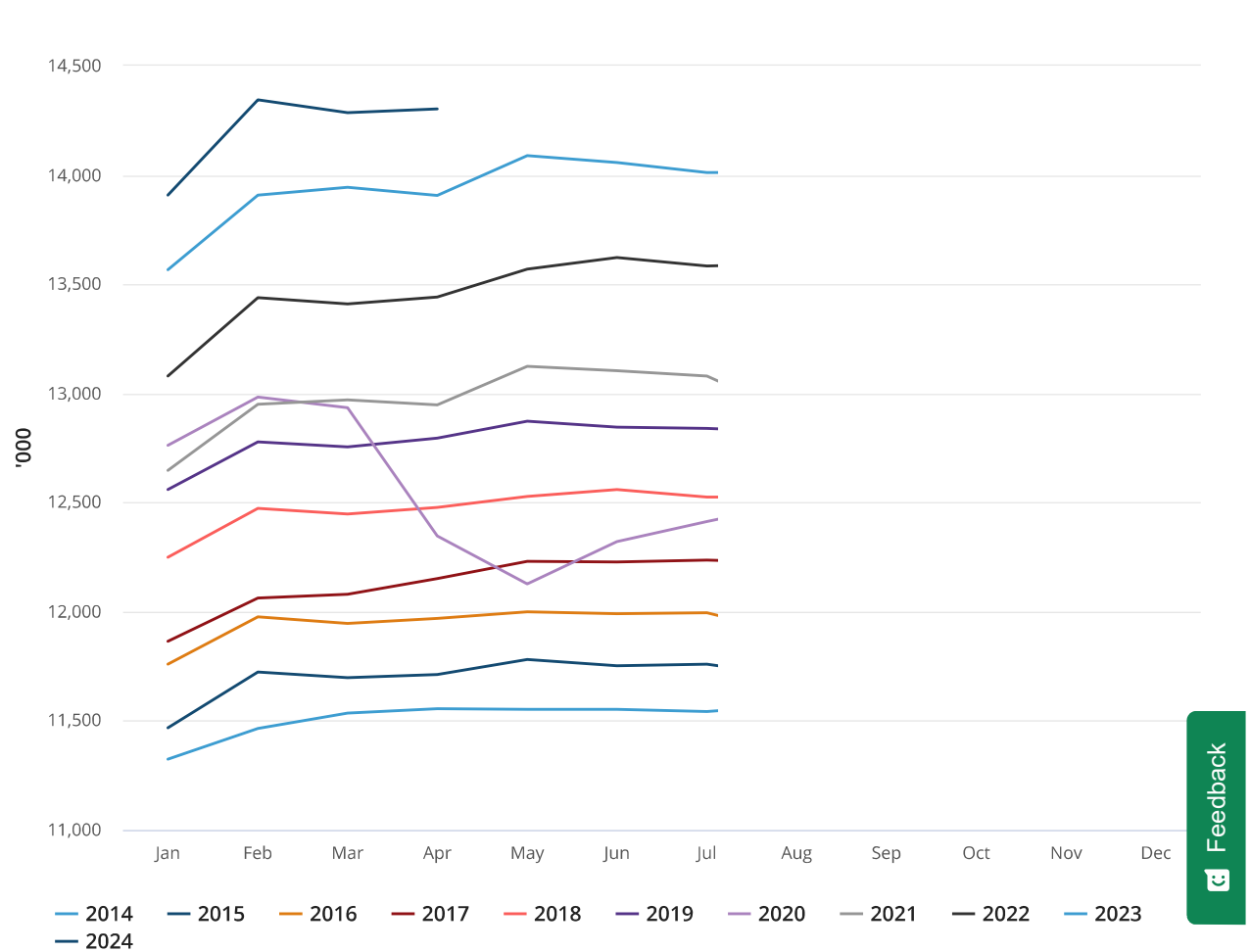


Source: Labour Force, Australia, Table 1 and GM1

Flows into and out of employment are extensive and are based on the net matched sample of original employment growth between two consecutive months (around 80% of the sample). The (net) sum of the inflows and outflows does not necessarily equal the 'net' employment growth.

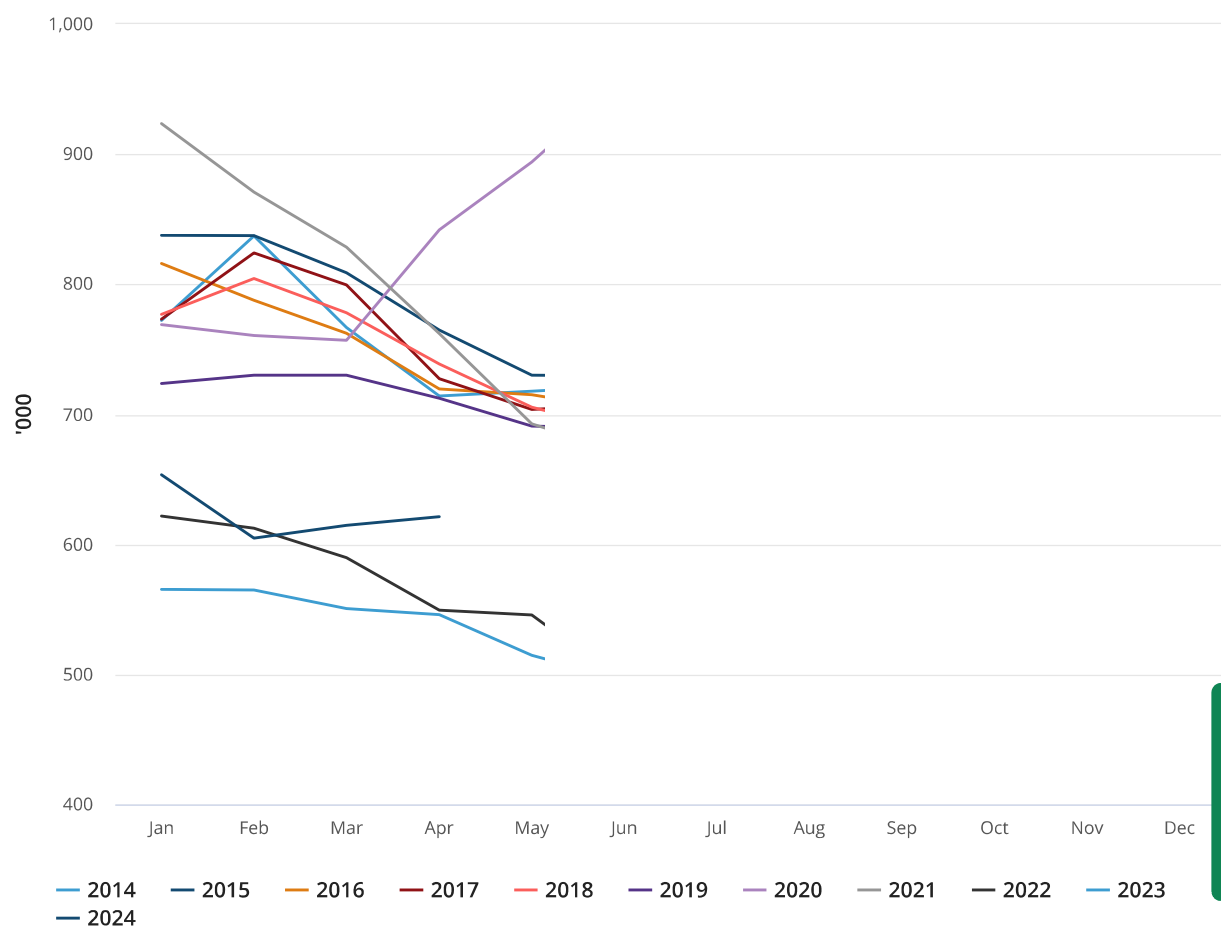
The flows into and out of employment and unemployment translate into net increases or decreases in employment and unemployment. This can be seen in Charts 12 and 13, which show the level of employment and unemployment over the past decade, in original terms. Seasonal adjustment controls for the systematic seasonal patterns in these series.

**Chart 12: Employed people, Australia, Original**



Source: Labour Force, Australia, Table 1

Chart 13: Unemployed people, Australia, Original



Source: Labour Force, Australia, Table 1

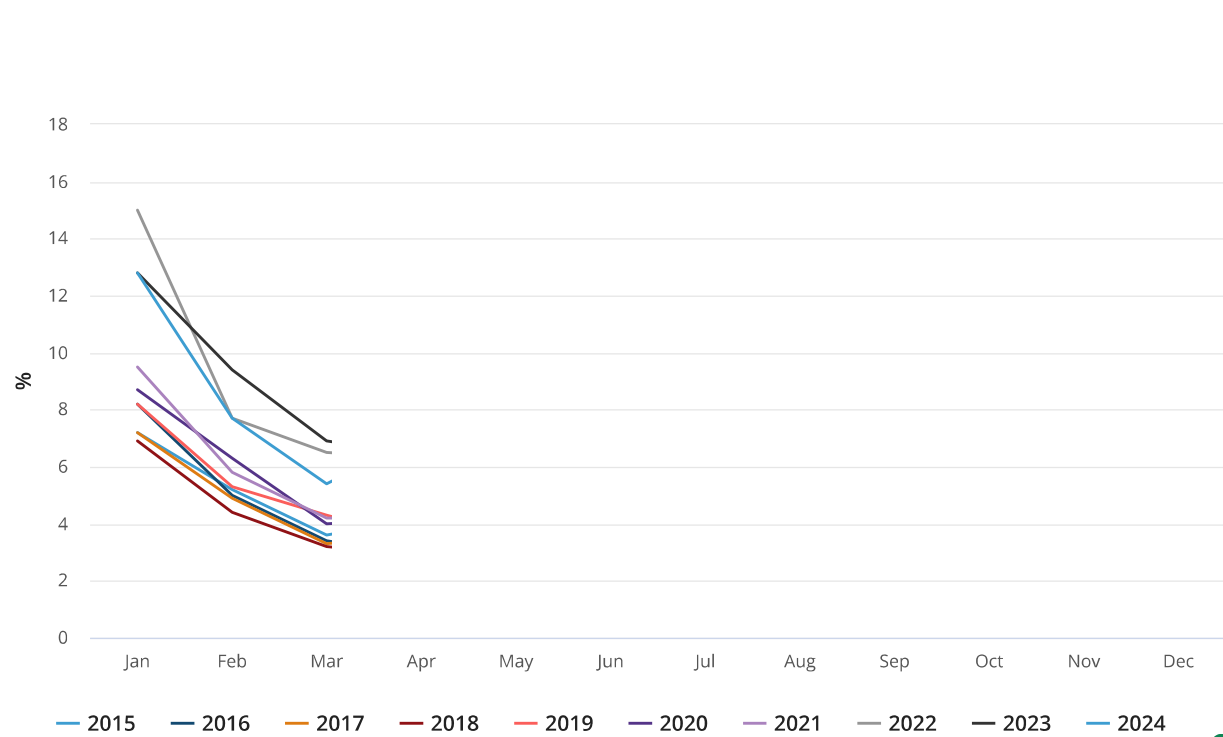
The seasonal patterns in employment and unemployment are influenced by underlying changes in the timing and extent of these flows into and out of employment and unemployment. For instance, Chart 11 shows the usual saw-tooth pattern of a large outflow of people from employment between December and January, and a large inflow of people into employment between January and February.

This pattern can be seen in the employment outflows between December 2023 and January 2024, and the inflows between January 2024 and February 2024. However, their magnitude was greater than in 2023 and compared with the period just before the pandemic (the flows in early 2024 were around 4% of the population, compared with around 3% immediately prior to the pandemic).

The ABS explored this in detail in an [article with the January 2024 release \(/articles/insights-job-attachment-january-2024\)](/articles/insights-job-attachment-january-2024), which included Chart 14 and Chart 15, which have been updated to also show data for February, March and April 2024. They show the elevated share of people in recent Januarys who were waiting to start work in February, which was particularly pronounced in 2024.

Chart 14 also highlights the increase in the number of unemployed people in April who had a job they were waiting to start in May, and that this was a higher percentage of unemployed people than in March.

Chart 14: Proportion of unemployed people who were waiting to start work, Original



Source: Longitudinal Labour Force, Australia

Chart 15: Proportion of people Not in the Labour Force waiting to start work, Original







Source: Longitudinal Labour Force, Australia

The different patterns in these charts may be an indication that the seasonal pattern is changing, reflecting ongoing and lasting changes in employer hiring and business operation patterns (for example, when experienced staff in the business return from leave), or employees preferring to start or return to jobs after the end of the summer holiday.

Alternatively, some or all of this could be temporary, and associated with business and worker behaviours and dynamics within a historically tight labour market.

For instance, Chart 14 also shows a different dynamic in October in both 2022 and 2023, compared to earlier years. The small peak around October shows that some of the people who would normally have entered employment in December were instead entering in November. This could reflect a temporary effect related to earlier end-of-year recruitment activity in a tight labour market, or an ongoing effect around changing seasonality in retail trade activity, along with a range of other potential temporary or ongoing factors.

Future data will improve our understanding of how much of these changes over the past three years reflect an evolving seasonal pattern.

## How to contact us with questions or feedback

The ABS always seeks to provide guidance and advice to users to assist in interpreting changes in Labour Force data over time.

If you have a question or have any feedback on additional explanatory that would be useful, please contact us at [labour.statistics@abs.gov.au](mailto:labour.statistics@abs.gov.au) (<mailto:labour.statistics@abs.gov.au>).